thereof. No new matter is added. Reconsideration of the rejected claims in view of the above amendments and the following remarks is respectfully requested.

Allowed Claim

Applicants gratefully acknowledge that claim 19 contains allowable subject matter. Claim 19 is amended to overcome the §112, 2nd paragraph rejection, and to incorporate the subject matter of claim 6. Claim 19 is thus in condition for allowance. Applicants also submit that the remaining claims are in condition for allowance for the following reasons set forth below.

Objection to the Drawings

The drawings were objected to because they did not clearly label the flange. Applicants submit revised Figure 3 with a Request for Approval of Drawing Correction. To remedy this deficiency, Figure 3 is revised to include the notation "F" for labeling the flange. The specification is also amended at page 14 to provide this same notation.

Applicants now request withdrawal of the objection to the drawings.

§112, 2nd Paragraph, Rejection

Claims 9, 10, 11 and 19 were rejected under 35 U.S.C. §112, 2nd paragraph. This rejection is partially traversed.

Claim 19 is amended to provide proper antecedent basis to "the casting". Claims 7 and 8 are amended to recite "one" side and "other" side, which is consistent with the terminology used in claim 6. Both claims 7 and 8 have their dependencies originating from claim 6. More specifically, claims 7 and 8 are amended to recite, in part,

> wherein the <u>one</u> side of providing said cylinder is made an action chamber; the <u>other</u> side of providing said reaction pawl and said bridge is made a reaction chamber; and a thick-walled connection between said cylinder and said bridge is made a central chamber

This amendment should further clarify the claims and overcome a portion of the §112, 2nd paragraph, rejection.

As to the rejection of claims 9-11, Applicants submit that the "central chamber" should not be interpreted as the "central portion". The central chamber is defined at pages 19 and 20, and more specifically, the central chamber is the "thick walled connecting portion D formed between the cylinder 20 and the bridge 40." On the other hand, the central portion refers to the central portion of the action chamber. The action chamber is shown in Figure 7 as sections A, B and C.

In view of the above, Applicants now request withdrawal of the §112, 2nd paragraph, rejection.

Prior Art Rejections

Claims 6, 9 and 13-17 were rejected under 35 U.S.C. §103(a) over Evans et al. in view of Ogino and Takasaki et al. Claims 7, 8, 10 and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Evans, Ogino, Takasaki and JP-1146718. Claim 18 was rejected under 35 U.S.C. §103(a) over Evans, Ogino, Takasaki and Weiler. Claims 20-22 were rejected under 35 U.S.C. §103(a) over Evans, Ogino, Takasaki, JP-1146718 and Weiler. These rejections are specifically set forth on pages 4-6 of the present office action.

Applicants respectfully traverse these rejections. Applicants further request withdrawal of the above rejections for the following reasons.

Discussion of Invention

As previously discussed, the present invention is directed to a caliper body of vehicular disc brakes using a gravity casting method. The present invention includes (i) a cylinder disposed on one side of the disc rotor, (ii) a reaction pawl disposed on the other side of the disc rotor, and (iii) a bridge for coupling the cylinder and the reaction pawl at the outer peripheral side of the disc rotor. In embodiments, a union hole is formed at the bottom portion of the

cylinder of the caliper body as a sprue for molding the caliper body with a base material. The caliper body is cast by having a cavity with the side of molding the bottom portion of the cylinder disposed in the upper part of and in the vertical direction of the cavity and with the side of molding the reaction pawl disposed in the lower part of and in the vertical direction thereof. In another embodiment, the union hole is formed at the bottom portion of a cylinder of the caliper body as a sprue for molding the caliper body with a base material. The caliper body is molded with a cavity disposed with the union hole, while the side of molding the bottom portion of the cylinder is disposed in a vertically upper part of the cavity and also the side of molding the reaction pawl is disposed in a vertically lower part of the cavity.

Rejection of Claims
6, 9 and 13-17

As argued previously, in rejecting a claim under §103(a), three basic criteria must be met.

> First, there must be some suggestion or motivation, either in the references themselves or in knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claimed limitations.

MPEP § 2143.

In rejecting claims 6, 9 and 13-17, the Examiner asserted that it would have been obvious to combine Evans, Ogino and Takasaki in order to achieve the claimed invention. To support the Examiner's position, the Examiner asserted that Evans shows all of the features of the disc brake as shown in each independent claim, Ogino shows a gravity method of molding and Takasaki teaches a gravity casting process of a body having a union hole as a sprue for molding a body with a base material or aluminum alloy. The Examiner further asserted that the Takasaki body is molded with a cavity disposed with the union hole, while the side of molding the bottom portion

of a cylinder is disposed in a vertically upper part of the cavity and also the side of molding the other side is disposed in a vertically lower part of the cavity.

Applicants submit that there would be no reasonable expectation of success using the combination presented by the Examiner. Additionally, all of the claimed limitations would not be provided by the combination of these art references. For these reasons, Applicants submit that the Examiner has not provided a prima facie case of obviousness.

First, Applicants agree that Evans shows many of the features of the caliper body of the claimed invention; however, Applicants submit that Evans shows an important difference which, in combination with the remaining applied references, would not result in the claimed invention. In particular, as seen in both Figure 5 and Figure 15, the opening 23 is not displaced in vertical alignment with the cylinder 17; that is, the opening is substantially perpendicular to the cylinder 16. As seen in the embodiment of Figure 5, the opening 23 is disposed substantially at a right angle from the inboard leg or housing 12 and hence the cylinder assembly. In the embodiment of Figure 15, the "bosslike port" 23 protrudes substantially at a right angle from the cylinder rear wall 52 to allow for the cavity 53 to the rear of cylinder wall 17.

Applicants note that by having the opening at a right angle placement as presented in the Evans reference, the resulting structure, when molded using the combination of Ogino and Takasaki would not allow for

> ... the caliper body is molded with a cavity disposed with said union hole, while the side of molding said bottom portion of said cylinder is disposed in a vertically upper part of said cavity and also the side of molding said reaction pawl is disposed in a vertically lower part of said cavity....

Also, the placement or positioning of the opening 23 would not allow for the same advantageous provided by the claimed invention, i.e., an added thickness (i.e., increase in mass) in the central portion of the caliper body to ensure rigidity of the caliper body.

By way of explanation and in support of Applicants position, Ogino shows a gravity method of casting. As to Takasaki, a molding process is shown for a wheel.[1] Now, the use of the Takasaki method would be difficult if not impossible to use with the opening 23 of Evans, and would not result in the features of the claimed invention. As seen in Takasaki, a rotary-mold gravity casting process for molding wheels of a vehicle (col. 2, lines 10-15) is shown. In this method, a casting mold including a hopper for pouring a molten metal to a runner is provided. The molten material is poured from the hopper into the cavity in the casting mold by placing the hopper and mold in a vertical position (Figure 2C). (The volume of the molten material in the casting mold can be regulated by adjusting the pivot of the hopper and mold, itself.) (See, col. 2 and 3 and Figures 2A-2C.)

However, by using this method in combination with the opening 23 of Evans, the molten material would not flow properly into the sprue in either the vertical or other angled hopper position. This is simply because the angle of the opening 23 of Evans would not be in vertical axial alignment during the pouring process. This is in contrast to Takasaki, which provides axial alignment of the opening with the vertical plane in Figure 2C thereby allowing a proper pouring of the melt, itself. By having the alignment of the opening, the melt can be regulated and poured more uniformly using the method of Takasaki. However, with the angled opening of Evans, it cannot be expected that an even flow of melt or the same thickness profile as provided by the present invention will result. Thus, the advantages of the present invention are lost. Accordingly, there would not seem to be any reasonable expectation of success.

Also, even if the mold were only placed at an angle such as that shown in Figure 2B of Takasaki, it is submitted that this would still not result in all of the limitations of the claimed invention. By way of example, if the mold is not in the completely vertical position (i) the side of molding the bottom portion of the cylinder cannot be disposed in a vertically upper part of the cavity and (ii) the side of molding the reaction pawl cannot be disposed in a vertically lower part of the cavity.

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[1] However, Takasaki does not show molding a caliper body nor any features thereof such as, for example, a reaction pawl, a cylinder or a union hole. The wheel would certainly not have these features of the claimed invention, especially a union hole used to provide pressure to the cylinder.

Additionally, it is not taught by Takasaki (USP 5,704,413) that a sprue (i.e., a runner 5) becomes (a flange portion of) a hole for entering air into a tire to be mounted on a vehicle wheel that has been casted. This runner 5 of Takisaki is quite different in structure from the present invention.

Namely, as shown in Figures 3 and 4 attached hereto, the union hole 24 of the present invention is a (union) hole for entering an operation oil (brake fluid) after being assembled as a product. The flange portion of the union hole 24 of the present invention is formed by processing/machining a hole that would be able to act as a sprue in the casting operation. On the other hand, the sprue (runner) 5 of Takasaki only functions as a hole through which a molten metal is supplied in the casting operation. Takasaki does not teach or suggest that such a sprue/hole is subject to further machining operation so as to have a different function after the casting. As a tire wheel described by Takasaki, it becomes necessary to have a hole through which air can be supplied to the tire mounted to the wheel. However, Takasaki does not teach that such tire air supplying hole is formed by utilizing the sprue/hole. That is, in Takasaki, the runner portion is to be covered by a tire, and as such an air supply hole for the tire is not formed by machining the runner portion. The direction of the air supply hole is shown in the attached Figures 1 and 2C of Takasaki.

Further, in the present invention, the molten metal is casted/supplied to a reaction side (awl side) from the cylinder side opposite to the reaction side while the cylinder side is positioned upside in the vertical direction, in such a manner that the molten metal can be easily flown. Accordingly, the directivity of the molten metal can be made very clear. On the other hand, since the tire wheel taught by Takasaki is formed into a sleeve shape, such a sprue formed at the side surface would be positioned without considering the directivity. In other words, Takasaki allows the sprue to be positioned at anywhere in the side surface of the wheel. Namely, the gate mark of the sprue can be appeared/remained anywhere in the side surface of the vehicle tire wheel. Also, the wheel is made of aluminum as described at col. 2, lines 1-16. Because of the wheel geometry, for example, in this case a vehicle wheel, any side surface of the wheel may

be positioned in several ways (e.g., upside down). That is, the wheel does not have to be in a fixed position.

Moreover, neither Evans or Ogino teaches or suggests a casting process of the molten metal in the caliper body casting method, and Takasaki does not have a directivity of the molten metal at the side surface portion. Accordingly, it is Applicants' opinion that the combination of references do not teach the claimed invention by combining these prior art. (See again Figure 1 and 2C of Takasaki, attached hereto, for a further explanation.)

For these reasons, it is submitted the Examiner has failed to prove a prima facie case of obviousness. Simply, there is no suggestion or motivation to modify or combine the references in order to obtain the claimed invention. This is based on: (i) Evans teaching an opening that would prohibit the proper flow of the molten material when the mold is in the vertical position, (ii) there can be no reasonable expectation of success using the combination as presented by the Examiner and (iii) all of the features of the claimed invention would not result from combining the references as suggested by the Examiner.

Rejection of Claims
7, 8, 10 and 11

In the rejection of claims 7, 8, 10, and 11, the Examiner asserted that JP-1146718 teaches the use of an optimal volume ratio to achieve little to no sink marks. Although JP-1146718 discusses optimal volumes, there is no teaching whatsoever concerning the specific parameters as recited in claims 7 and 8. JP-1146718 merely generalizes the problem and is more associated with storing data on compression pressure and variations of volume due to cooling temperature on a storage medium. Accordingly, Applicants would request that the Examiner provide a reference that definitively shows the features of the claimed invention in order to provide a prima facie case of obviousness.

Applicants also submit that the Examiner is now using <u>four</u> references in order to reject the claimed invention. Applicants respectfully submit that this is tantamount to picking and choosing from the "parts bin" of the Patent Office files to find a reference showing but one

element in the claim, and then assembling the parts to form Applicants' invention using hindsight reconstruction with the Applicants' patent specification as a blueprint. Of course, this type of approach is prohibited under §103 since the applied references themselves must teach the claimed invention.

Rejection of Claims
18 and 20-22

First, Applicants submit that the Examiner is using four references in rejecting claim 18 and five references in rejecting claims 20-22. In both rejections, Applicants respectfully submit that this is tantamount to picking and choosing from the "parts bin" of the Patent Office files to find a reference showing but one element in the claim, and then assembling the parts to form Applicants' invention using hindsight reconstruction with the Applicants' patent specification as a blueprint. This type of approach is prohibited under §103.

Second, Applicants disagree with the Examiner's argument as it relates to at least claims 20-22. In this argument, the Examiner is of the opinion that the symmetry of the mold and the running of the based material towards the bridge and the reaction pawl would be provided by the core of Weiler. Although this may be true, it is submitted that the core has to be positioned in the proper place for this to occur. The Weiler reference is only used to generally support the use of a core, but does not teach the specific placement thereof and hence there is no suggestion of the features argued by the Examiner.

Third, the Examiner also neglects to even consider all of the elements of claim 22. For example, the Examiner does not even address the features of

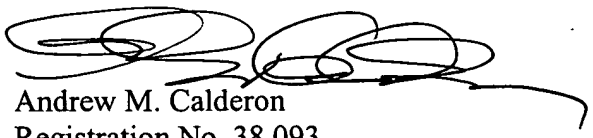
> ... the solidification of the base material progresses toward said thick walled portion where the solidification is slower such that even though the volume of said reaction pawl is reduced because of the solidification, a supply of the base material from said thick walled portion continues due to a supply effect based on the ratio of volume, whereby any sink mark is prevented from being produced in the reaction pawl

In any event, Applicants submit that these features are not taught or suggested by the combination of references.

Conclusion

Applicants appreciate the indication that claim 19 contains allowable subject matter; however, in view of the foregoing amendments and remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 23-1951.

Respectfully submitted,



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Marked-Up Copy of Claims

The following is a marked-up copy of amended claims 7, 8 and 19.

7. (Twice Amended) The caliper body of the vehicular disc brake as claimed in claim 6, wherein the one side of providing said cylinder is made an action chamber; the other side of providing said reaction pawl and said bridge is made a reaction chamber; and a thick-walled connection between said cylinder and said bridge is made a central chamber, and

wherein in the state of cast metal after casting but before being subjected to a cutting process,

the ratio of volume of the central chamber to that of the reaction chamber is in the range of 0.6 to 1.25, and

the ratio of volume of the central chamber to that of the action chamber is in the range of 0.7 to 1.35.

8. (Twice Amended) The caliper body of the vehicular disc brake as claimed in claim 6, wherein the one side of providing said cylinder is made an action chamber; the other side of providing said reaction pawl and said bridge is made a reaction chamber; and a thick-walled connection between said cylinder and said bridge is made a central chamber, and

wherein in the state of cast metal after casting and subjected to a cutting process,

the ratio of volume of the central chamber to that of the 5 reaction chamber is in the range of 0.6 to 1.25, and

the ratio of volume of the central chamber to that of the action chamber is in the range of 0.7 to 1.35.

19. (Amended) [The caliper body of the vehicular disc brake as claimed in claim 6,] A caliper body of a vehicular disc brake to be made by a casting method, said vehicular disc brake

having a pair of frictional pads disposed opposite to each other with a disc rotor held therebetween, said caliper body including a cylinder disposed on one side of the disc rotor, a reaction pawl disposed on the other side of the disc rotor, and a bridge for coupling said cylinder and said reaction pawl at the outer peripheral side of the disc rotor, said caliper body comprising:

a union hole formed at the bottom portion of said cylinder of the caliper body as a sprue for molding the caliper body with a base material, wherein the caliper body is molded with a cavity disposed with said union hole, while the side of molding said bottom portion of said cylinder is disposed in a vertically upper part of said cavity and also the side of molding said reaction pawl is disposed in a vertically lower part of said cavity,

wherein a flange portion of the union hole is formed by processing the sprue after [the] a casting.

Marked Up Version of Changes to Specification

Please replace the paragraph at page 14, lines 16-20.

With attention riveted to the sprue portion, the formation of the sprue in the central portion of the edge face of the cylinder is advantageous in that the flange portion "F" of the edge union hole 24 is simply formable only by processing the sprue portion after the casing.

No. 4

Takasaki

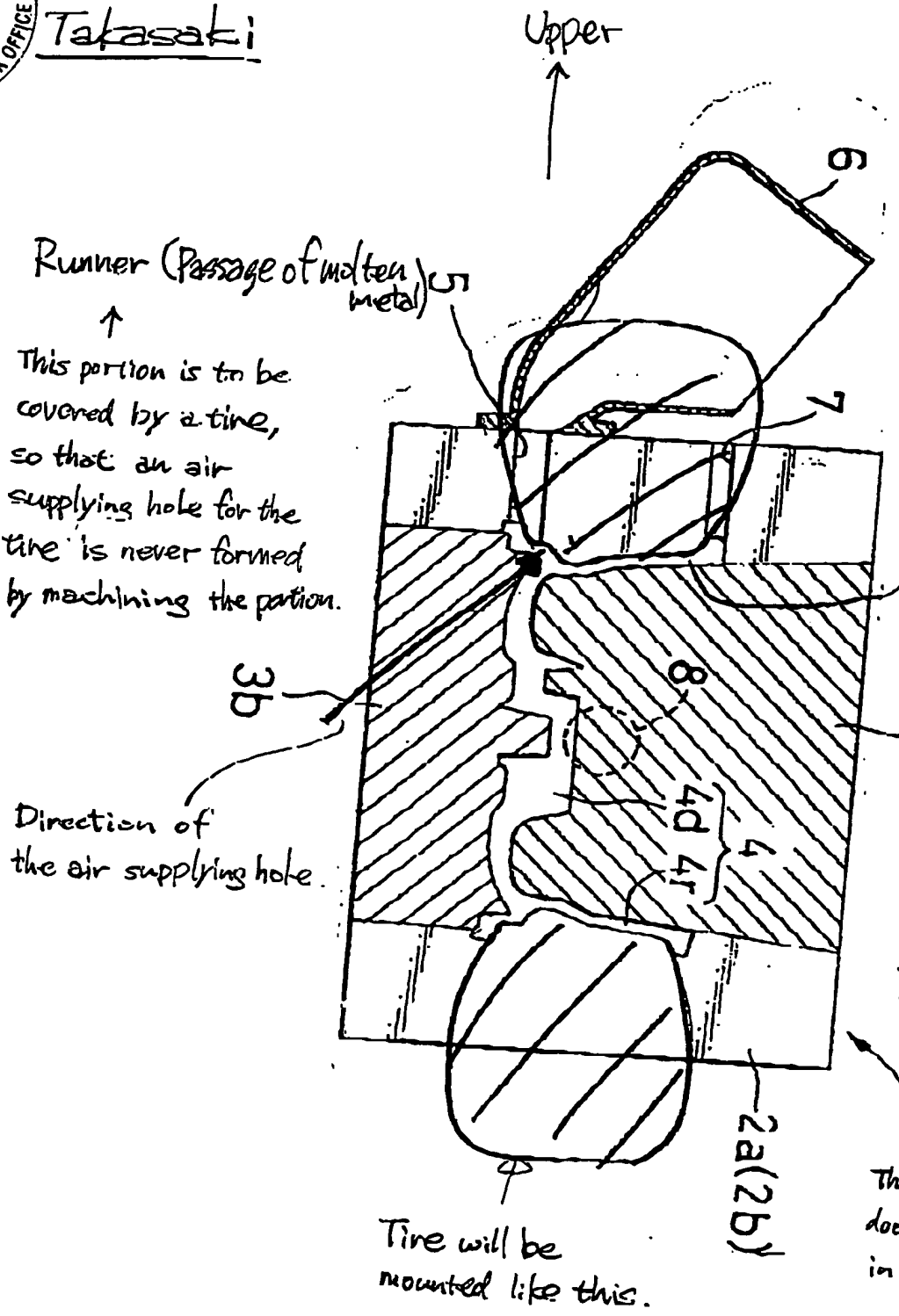

FIG. 1

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No. 2/4

Takasaki

FIG.2A

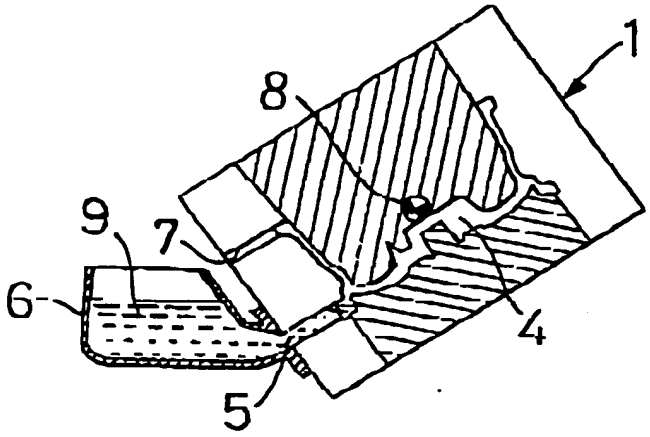
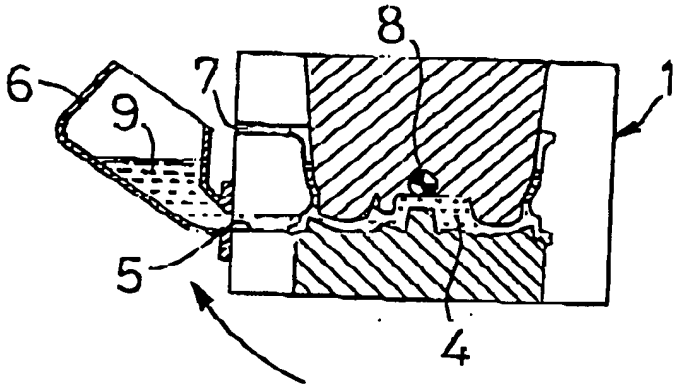
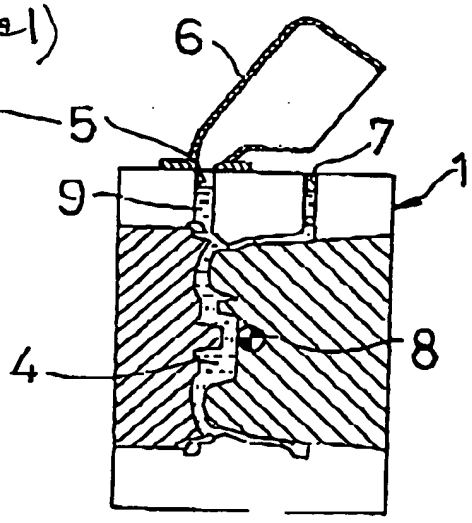


FIG.2B



Runner
(Passage of Molten Metal)

FIG.2C



No. 3/4

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Present Invention

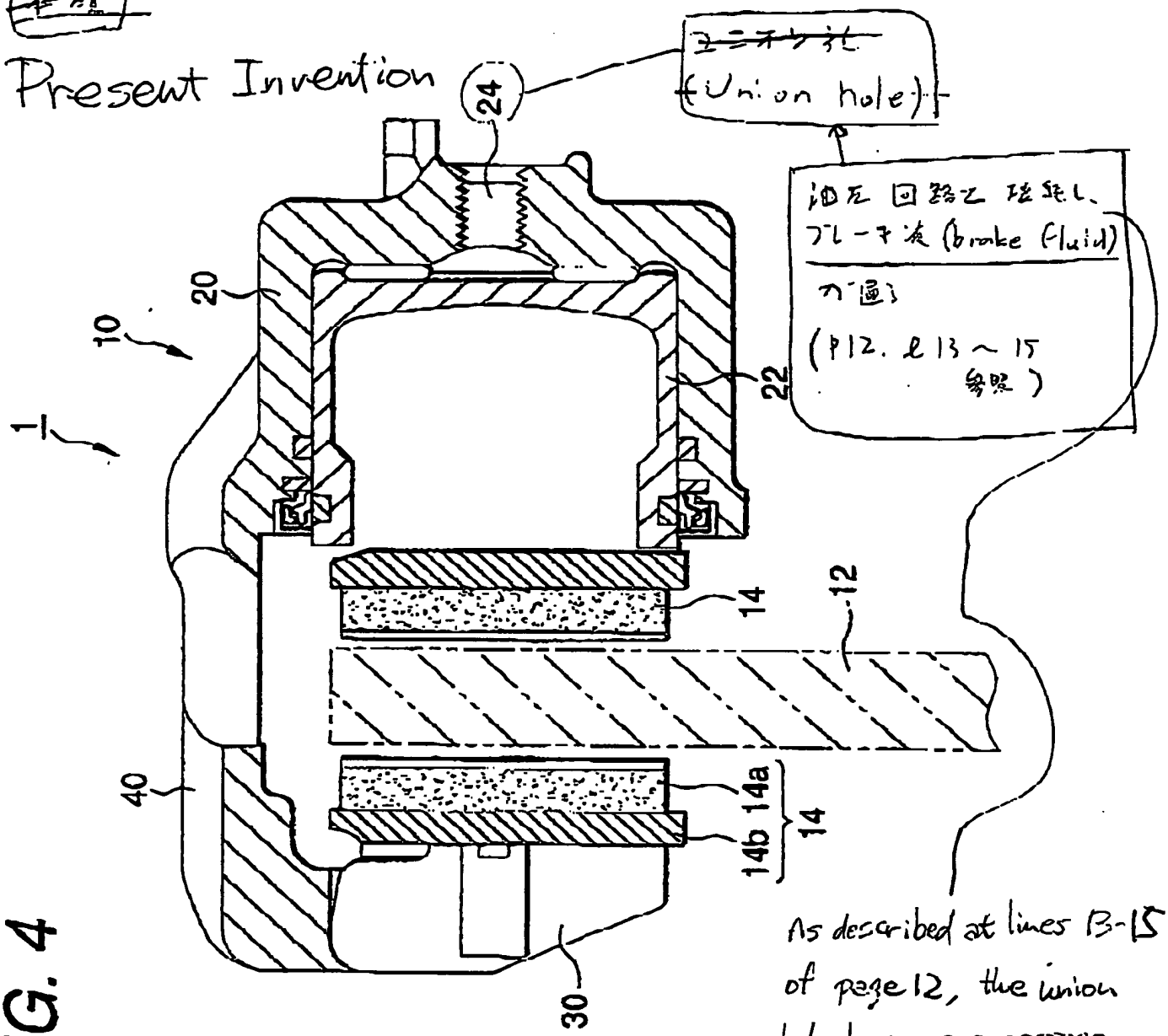

FIG. 4

As described at lines 13-15 of page 12, the union hole becomes a passage that is connected to a hydraulic circuit and through which a brake fluid is passed.

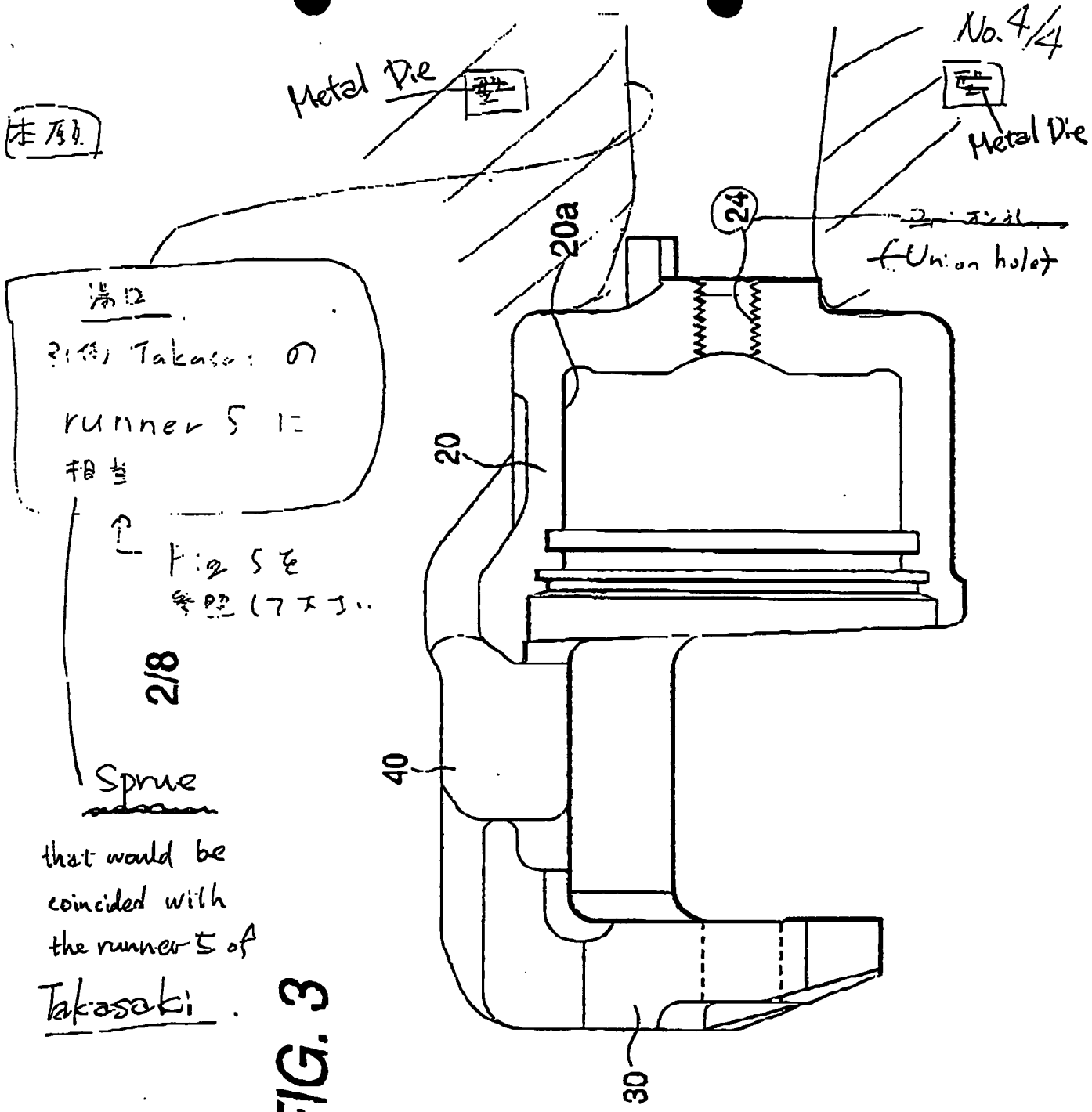

FIG. 3

Drawing approved by Examiner 3/6/03

FIG. 3

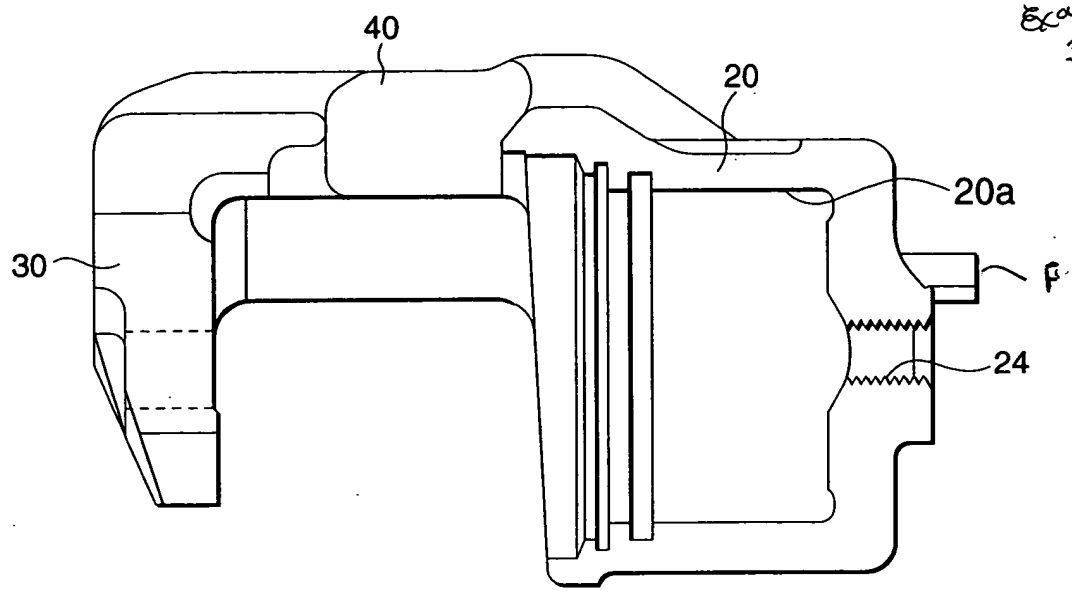

FIG. 4